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was on the right side wanting, while on the posterior third, on that side, it was apparently reduced. During convalescence the sense of taste and contact returned, while the second branch of the trigeminus was still anaesthetic; and since there were no symptoms due to the injury of the facialis and the glossopharyngeus, F. contests the current view concerning the course of the gustatory fibres, and concludes that the latter pursue either the course designated by Schiff, through the corda tympani, ganglion oticum, the third branch of the fifth, and so to the brain, or never enter the corda tympani (Bernard), but pass in the third branch of the trigeminus without leaving it.

Les troubles moteurs du cerveau. FR. FRANCK. Extrait d'un livre qui paraîtra prochainement à la librairie Doin: Leçons sur les fonctions motrices du cerveau. 1 Vol., 8°. Rev. Scientif. 1887, XXXIX, 25, p. 788. Autoreferat.

The author briefly reviews the results of experimental physiology on this point. He lays much weight on the increase in both the intensity and duration of the phenomena following extirpation as we ascend in the animal scale. In monkeys that gradual recovery is wanting which in dogs takes place to a certain degree. Seeking by clinical-anatomical methods to establish the extent of the motor centres in man, he confines them to the gyri centrales and to the lobulus paracentralis, in this agreeing closely with Nothnagel, who recently investigated the subject by the same methods.

Zur feineren Structur der Nervenfasern. JOSEPH. Verhandl. d. physiolog. Gesellschaft zu Berlin, Jan. 20, 1888, Nos. 5 and 6.

In repeating Kupffer's studies on the fibrillar structure of the axis cylinder in the nerve fibre J. has made use of methods slightly modified from those of Kupffer. In the medullary sheath J. finds a network which he identifies with the neurokeratin framework of Ewald and Kuehne. This framework is not considered as anything preformed, but merely as the expression of a substance other than the myeline which takes its marked form under the action of reagents. All the samples which he has thus far tried have not resisted the action of digesting reagents, and thus fail to agree with the substance described by Ewald and Kuehne. As regards the axis cylinder, he substantiates Kupffer's description of the fibrillae, but takes exception to the designation of the interfibrillar as a nerve serum. J. describes the fibrillae as held in the meshes of a fine network. These studies were largely made on the electric nerves of *Torpedo marmorata*.

II.—EXPERIMENTAL.

In March last the writer of this note received a clipping from *Science* on "Sound Blindness," with a marginal note from Dr. G. S. Hall, saying: "Can you look into this subject?" Permission to enter the public schools for the purpose was granted by the Boston School Board, and, standing on the teacher's platform, the following words were pronounced, after testing the pitch and loudness of voice by a few words addressed to the master who stood at the opposite side of the room: ultramarine, altruistic, frustrate, ultimatum, ulu-

late, Alcibiades, and unaugmented were the first words used. Time was given between the pronunciation of each for the slowest pupil to write it upon a slip of paper, words being repeated as often as required, some of them having been clearly pronounced five successive times. In the Latin School, 259 boys whose ages range from 12 to 20 years were given this test, 84 of whom made corresponding mistakes in the vowel sounds, their papers showing, *e. g.*, altramarine, ultruistic, frostrate, altimatum, elulate, olulate, alulate, and unolmented. Alcibiades suffered the least, probably on account of familiarity with the name.

At this stage of the investigation, Dr. Clarence Blake, the distinguished aurist of Boston, was consulted, who gave a much better list of test-words, viz., fan, log, long, pen, dog, pod, land, few, and cat. The 84 pupils who confused the vowel sounds in the polysyllables were seated in their various rooms in the front row, while the observer stood at the back of the room, pronouncing these monosyllables but once, the pupils having had notice of this arrangement that they might give instant attention. Only 4 of the 84 spelled all these monosyllables correctly, their papers showing than, thank, fanned, clam, thang, and fam, with several blanks in place of *fan*; glove, clog, lug, love, land, long, knob, for *log*; lung, lown, lone, lawn, lamb, log, loud, and lamp, for *long*; penned, pan, paint, hen, and ten, for *pen*; dove, dug, and dot, for *dog*; hour, heart, hog, hod, hard, fod, thod, fog, bog, pug, part, plot, pard, long, and bog, for *pod*; lamb, lend, lamp, lambled, blend, hen, and can, for *land*; frew, fuse, pew, and pen, for *few*; cat having been understood in every instance. A final and individual test with an aurist's tuning fork was now given the 80 pupils who failed in correct hearing of these words, Dr. Blake kindly supplying the fork (C 562 v. s.) and directing its use; the fork was struck with a rubber-covered hammer, the pupil standing twelve feet away with his back toward the observer. Two cases of deafness were found, but these were known to the teacher, though not to the master. Several doubtful cases appeared which were given the benefit of the doubt, it not being practicable to refer them to a specialist, and the atmosphere of that day being so damp that the instrument gave uncertain sounds.

In the English High School of Boston, 223 boys between the ages of 13 and 18 were tested with the polysyllables, 105 of whom made mistakes corresponding to those already noted. Of the 105, 92 misspelled from one to four of the monosyllables, the errors being in general a repetition of those made in the Latin School in which pupils are received prior to graduation from Grammar School, while all English High School pupils are graduates of grammar departments.

In the Comins Grammar School, 530 pupils between the ages of 8 and 14 were tested with the monosyllables, only 34 of whom spelled all the words correctly. The following tables are based upon the work done in this school, because the opportunities were such as to give fairer results, the same room being used for every pupil tested, and the test words given to classes of 16 only, there being no other pupils in the room and no outside distractions; with the tuning fork first used there were unavoidable variations of weight in the stroke, dependent upon the mental and physical conditions of the observer, and Dr. Blake kindly furnished another, to be differently manipulated. Five children were found who could not hear this tone

twelve feet away, and in neither case had the teachers or master suspected the existence of any disorder of the ear. Two of these were among the brightest in the room, and were seated farthest from their teachers; the others were supposed to be dull and inattentive. After the discovery of deafness, these pupils were particularly observed by their teachers, and the bright ones were found to have the habit of closely watching the face of any one speaking, bending to the right or left during dictation exercises in order not to lose sight of the lips.

For fan, 7 different words and 2 blanks were given, the blanks indicating that the pupil entirely failed to understand the word, and the figures following each word indicating the number of times it was used: than 5; fair 4; thank 3; fell 2; clams, fang, and sam, each once.

For log, 17 words and 10 blanks were given: love 65; flog 3; dog 3; cock 2; long, lo, lack, lawl, lord, lull, lock, lough, loud, lode, glove, bog, and bare, each once.

For long, 14 words and 11 blanks were given: lawn 4; log 3; loan 3; lamb 2; alarm, arm, kong, lung, lant, length, lul, love, lone, and laugh, each once.

For pen, 18 words and 12 blanks were given: hen 48; pan 47; hand 13; ham 5; pain 4; pine 3; pail 3; head 2; paper, paint, pear, pland, can, han, land, ream, ten, and then, each once.

Six words and one blank were given for dog: dug 3; dove 3; dod, dollie, God, and dull, each once.

For pod, 51 words and 64 blanks were given: hog 85; hod 36; pog 26; hard 25; park 10; have 5; fog 6; pond 5; hot 4; cod 4; pug 4; hollow 3; path 3; pot 3; pob 3; pop 3; log 3; pual 3; heart 2; hug 2; prove 2; papa 2; dod 2; long 2; tog 2; hove, hoe, hawk, hove, hoad, hoge, hart, half, hord, hope, hub, hark, hood, pawd, parg, palm, pant, paw, parm, pok, pout, pard, bong, cot, tod, and of, each once.

For land, 14 words and 12 blanks were given: lamb 42; lion 4; lamp 3; light 2; lank 2; lame 2; lamps, lung, line, light, lend, lampt, lade, and plant, once.

For few, 11 words and 10 blanks were given: flew 4; pew 2; fillt, form, fill, furyon, frew, fug, huge, pill, and pail, once.

Five words and no blanks were given for cat: catch, cans, cap, kept, kait.

The logographic value of letters being modified by those which precede or follow them, the mistakes made will be arranged as they occur in the words given.

F labial, in *fan*, was understood as: c hard palatal 1; s aspirate 1; th lingual 8. A short: e short 2. N lingual: l lingual 1; m labial nasal 1; ms 1; ng 1; nk 1.

Pen.—P labial: c hard palatal 1; l lingual 1; r liquid 1; t lingual 1; h aspirate 69. E short: e long 1; i short 2; i long 3; a long 9; a short 69. N liquid: t lingual 1; r liquid 2; l liquid 1; m labial nasal 6; d lingual 17.

Land.—L liquid: pl 2. A short: u short 1; e short 1; a long 3; i long 8. N liquid: ng 1; m labial nasal 49. D lingual: k palatal 2; p labial 4; t lingual 6; escaping the ear entirely, as in lion, line, etc., 4.

Dog.—D lingual: g palatal 1. O short: u short 7. G palatal: v labio-dental 1; l liquid 2; d lingual 2.

Log.—L liquid : gl 1; fl 3; c palatal hard 2; b labial 2; d lingual 4. O short : a broad 1; ou 1; a short 2; o long 2; u short 68. G palatal : l liquid 2; d lingual 3; k palatal 4; v labio-dental 66.

Long.—L liquid : al 1; ar 1; gl 2; k palatal 1. O short : u short 1; e short 1; a medial 2; a short 3; a broad 5; o long 5. Ng : f labio-dental 1; l liquid 1; t dental 1; v labio-dental 1; g palatal 3; n liquid 7; th added 1.

Pòd.—P labial : b labial 1; d lingual 2; c hard 5; f labio-dental 6; t aspirate 6; l liquid 7; h aspirate 171; no consonant before o once. O short : oo in hood 1; ou in pout 1; u long 3; o long 6; u short 7; a broad 7; a short 12. D lingual : g soft 1; f labio-dental 1; m liquid 2; th 3; p labial 3; b labial 4; ng 4; l liquid 5; v labio-dental 7; k palatal 13; t dental 17; g hard 132; open vowel 6.

Few.—F labio-dental : h aspirate 1; p labial 4. Ew : a long 1; o short 1; u short 2; i short 3; vowel sound preceded by l liquid 1, and by r 1; succeeded by g hard 1, by g soft 1, and by l 4.

Cat.—C palatal : h aspirate 1. A short : e short 1. T dental : p labial 1; ns 1; preceded by p 1, and succeeded by ch 1.

For courtesy extended by the teachers, whose routine work was somewhat interrupted, especial thanks are due, also to Dr. Merrill, head-master of the Boston Latin School, Mr. Pritchard of the Comins Grammar School, and the subordinates in all the schools entered; while the attention and ready obedience to directions of the pupils made the work a pleasure. Nothing could have been accomplished without the consent of the School Board, and the ready coöperation of that body is gratefully acknowledged.

As a matter of course, such tests lack mathematical accuracy, but great pains was taken, and much private practice made the pronunciation as nearly exact and even as it would be likely to be under any circumstances. The work was experimental, the path unbroken; better methods will undoubtedly be devised and more surprising results obtained.

One circumstance is not without suggestiveness. A child seven years old, with peculiarly abnormal development, was pronounced feeble-minded by examining physicians, but was retained in the kindergarten, where it received especial attention and made marked improvement. Dr. Blake kindly examined the child and found that early trouble with the inner ear had occasioned a period of deafness which had arrested mental development. The child is to be sent to the School for Deaf Mutes to learn the use of his vocal organs, instead of the School for Feeble-minded Children, the ear meanwhile to receive such treatment as the disorder indicates.

SARA E. WILTSE.

Sulla riproduzione degli Organi Gustatorii. LUIGI GRIFFINI. *Rendiconti Rëale Istituto Lombardo*, Ser. II, Vol. XX, 1887, pp. 667-683, 2 tavole.

Dr. Luigi Griffini, of Modena, has quite lately published (*Rendiconti del Reale Istituto Lombardo*, XX, 1887) an interesting memoir containing the results of his experimental study of the reproduction of the gustatory papillae and regeneration of the taste-bulbs in the rabbit and dog. It appears from his experiments that destruction (partial or complete) of the organs of taste is effected in two ways : first, by direct removal from the animal of the papillae themselves;